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Serum Cotinine Levels in Adults with Environmental Tobacco Smoke Exposure

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No conflict of interest

Background and Aim

- Tobacco consumption has known detrimental effects on health.
- About 22% of Myanmar population were smokers in 2010. [1]
- Across the world each year, tobacco use is responsible for the death of about six million people among which about 600,000 people are estimated to die from the effects of environmental tobacco smoke (ETS). [2]
- As the health hazards of tobacco can be varied with level of exposure, tobacco-related health hazards occur not only in active smokers but also in ETS-exposed Non-smokers.[3]
- Multiple biomarkers of tobacco exposure have been reported among which cotinine, a metabolite of nicotine, appears to be the most specific and sensitive biomarker. [4]
- This study aimed to determine the serum cotinine levels in adults with ETS exposure.

Materials and Method

Fasting blood was taken from adult male and female subjects, age between 30-45 years, who are

- ❖ Current cigarette smoker who has smoked at least seven cigarettes per day for a continuous period of one year or more, without betel quid chewing and cheroot smoking
- ❖ Current cheroot smoker who has smoked at least five cheroots per day for a continuous period of one year or more, without betel quid chewing and cigarette smoking
- ❖ ETS-exposed Non-smoker who has never smoked but has history of tobacco smoke exposure for at least past 6 consecutive months
- ❖ Non-exposed Non-smoker who has never smoked and generally free from ETS exposure

Serum cotinine levels were determined by using Enzyme-Linked Immunosorbent Assay method.

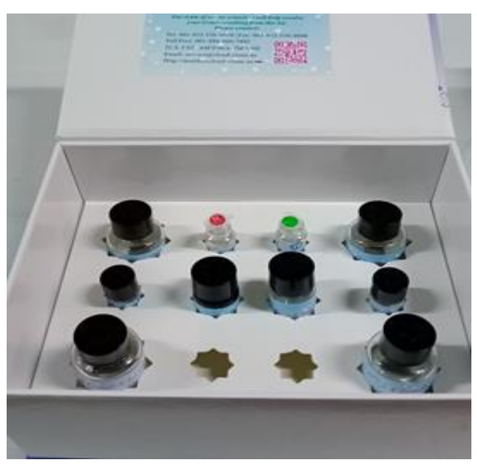

Fig 1. Cotinine ELISA Kit (Cloud-Clone Corp., USA)

Fig 2. Microplate reader (Shenzhen Mindray Bio-Medical Electronics Co.Ltd, Model MR-96A, Germany)

Results

Table 1. Serum cotinine concentration among different groups

Groups	Serum Cotinine (pg/mL) (MEAN ± SD)
Non-exposed Non-smokers (n=19)	729.39 ± 302.08
ETS-exposed Non-smokers (n=20)	876.58 ± 502.39
Cigarette smokers(n=20)	883 ± 152.18
Cheroot smokers (n=22)	1036.9 ± 270.98

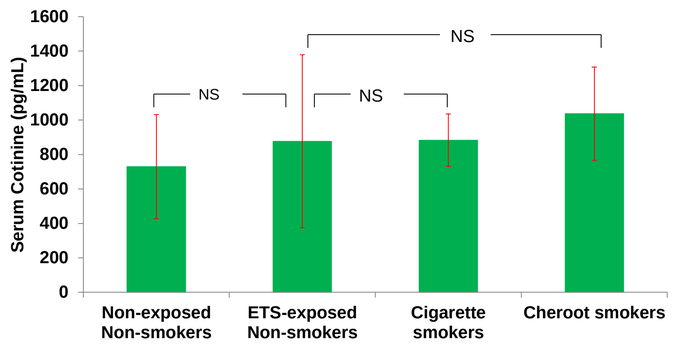

Fig 3. Serum cotinine concentration among different groups

NS indicates no significant difference (p >0.05)

Discussion

- ETS-exposed Non-smokers and Non-exposed Non-smokers have as much cotinine level as active smokers.
- Among active smokers, cheroot smokers have higher serum cotinine level than cigarette smokers. This might probably be due to higher nicotine content in cheroot because of its hand-made preparation.
- High serum cotinine in Non-exposed Non-smokers might be due to under-reporting of smoke exposure.

Conclusion and Recommendations

- Like active tobacco smoking, involuntary environmental tobacco smoke exposure can also increase serum cotinine levels.
- In order to achieve a meaningful reduction of tobacco-related health hazards, it is necessary to raise public awareness not only about **the danger of active smoking** but also **to avoid ETS exposure in public places and home.**

References

1. World Health Organization WHO global report on trends in prevalence of tobacco smoking 2015.
2. World Health Organization WHO Global Report Mortality Attributable to Tobacco. Fact-sheet mortality report 2004.
3. Zhang L, Curhan GC, Hu FB, Rimm EB, Forman JP. Association between passive and active smoking and incident type 2 diabetes in women. Diabetes Care 2011; 34:892-897.
4. Jarvis MJ, Tunstall-Pedoe H, Feyerabend C, Vesey C, Saloojee Y. Comparison of tests used to distinguish smokers from nonsmokers. Am J Public Health 1987; 77:1435-1438.